SERVICE BULLETIN No.1159

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COACH MODEL	**:** C2045
BULLETIN TYPE	**:** Service Information
MANUAL SECTION	**:** Chapter 10 - HVAC System
DATE	**:** March 10, 2006
SUBJECT	**: A/C compressor discharge line installation**
TERMS & CONDITIONS	**:** Repairs will be covered under warranty, only when executed in accordance with the procedures in this Bulletin. Contact ABC Customer Care & Parts Source for guidance.

APPLICATION:

Model	Engine	VIN
C2045	Cummins	45373 → 45494
	Detroit Diesel	45829 → 45999, 46501 → 46580

DESCRIPTION:

1. As a countermeasure for vibration caused by A/C compressor pressure pulses, Van Hool have revised the copper discharge line and flex hose installation in the engine compartment of C2045 commuter coaches.
   Cut-in units for production are #45495 (Cummins), #46581 (Detroit Diesel), and #47001 (Caterpillar).
2. To address the discharge line installation of the field coaches listed under “Application”, repair kit VH 10909541 has been released. Fitting this kit improves retention of the chassis-mounted refrigerant tubing where it connects to the hose. It also offers improved service life of the hose and the high side service valve.
3. The kit comprises a replacement copper tube and fitting assembly, to be soldered to the existing coach tubing, a mounting rubber and clamp, a bracket and mounting hardware (see Figure 1, and parts information on page 2/12).
4. To complement the installation of kit VH 10909541, the steel braided discharge hose should be replaced by a rubber item (refer to the parts section further in this Bulletin).
5. The procedures in this Bulletin provide the necessary fitting instructions (see Page 2/12 on).

Service personnel: please read, initial and circulate.

Service Manager	Parts Manager	Warranty Administrator	Workshop Foreman	Service Technician

PARTS AND PRODUCTS:

Repair kit VH 10909541

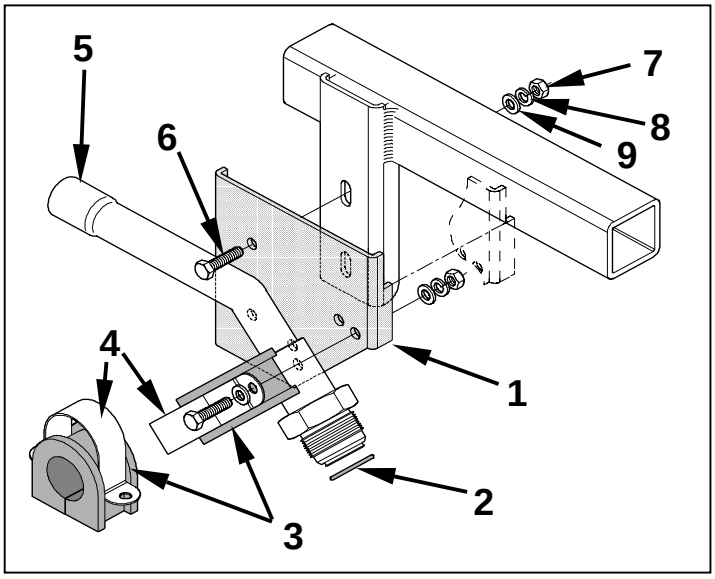


Figure 1: Discharge line repair kit VH 10909541

Part reference	Description	Pos.	Qty.
VH 10901886	Bracket, additional mtg. for VH 10910384	1	1
VH 10645815	O-ring, 22 mm	2	3
VH 10901210	Rubber, tube assy mtg	3	1
VH 10901212	Clamp	4	1
VH 10910384	Tube assembly, to solder, includes extended (long body) fitting	5	1
VH 660229755	Bolt, M6 x 25 mm, stainless	6	4
VH 660209922	Nut	7	4
VH 660623508	Washer, flat	8	6
VH 660636302	Washer, lock	9	4

A/C compressor discharge hose

Part reference	Description	Qty.
ABC-10220	Hose, A/C discharge, 39.0 inch, for Cummins and Detroit Diesel	1

- Parts supply: Parts will be supplied through regular channels.
- Parts and products disposition: Discard according to applicable environmental regulations.

PROCEDURE:

If you do not have the expertise to perform present procedure, do not hesitate to go to your nearest ABC Customer Care & Parts Source dealership.

1. General:

- This job should be executed by an experienced automotive HVAC technician.
- For more information on HVAC procedures refer to the Maintenance Manual, Chapter 10.
- Labor time estimate: 3.0 hours.

2. Special tools, equipment or services – Additional parts & products:

To install	Tools	Products
Repair kit VH 10909541	Tube cutter, soldering equipment, R-134a leak tester, all-in-one A/C station. Welding equipment for stainless steel.	Silver solder, R-134a refrigerant (33.65 to 34.75 lbs.), 1.5 ft thermal insulation VH 66012790, duct tape, filter dryer VH 632803148 (when the system shows damage), discharge line service valve VH 10901552 (when the system shows damage)

3. Preparations:

- Park the coach on a level surface with the front wheels straight. Apply the parking brake.
- Open the engine compartment doors.
- Check for refrigerant leakage at the discharge line service valve. If leakage occurs, replace the valve before installing rubber hose ABC-10220.
- Shut down the engine, switch off all systems and turn off the battery master switch.
- Put a "DO NOT OPERATE" tag on the instrument panel.
- Read the entire procedure before beginning to work.

CAUTION: When working in the engine compartment, turn the starter motor inhibitor switch to "starter motor disabled" for the steps, which do not require engine operation. Observe safe shop practices at all times.

4. To recover the refrigerant from the system and prepare repair kit installation:

Purpose of this section:

Installation of the repair kit requires the refrigerant circuit to be opened. This means that all refrigerant must first be removed from the system. Proceed as follows:

1) Turn on the master switch.
   In the luggage compartment, open the access door to the HVAC junction box. Set the service switch from "Clima operation" to "Service" to open the liquid line solenoid valves.

2) At the A/C compressor, remove/recover all refrigerant from the suction and discharge lines (see Figures 2 and 3).

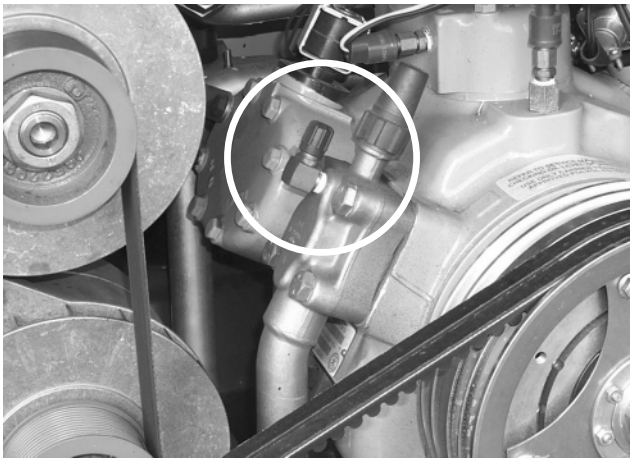


Figure 2: Suction line (low side) service valve

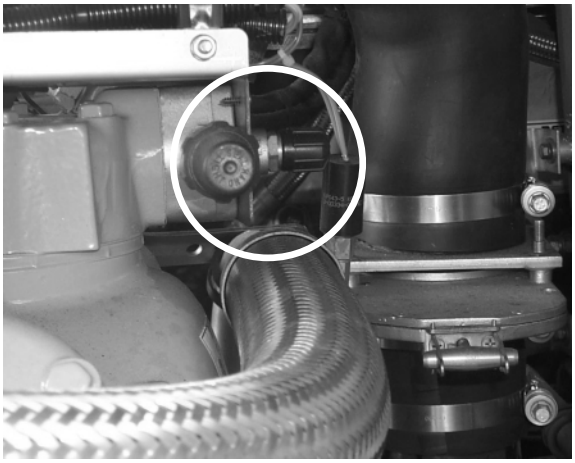


Figure 3: Discharge line (high side) service valve

3) At the condenser remove/recover all refrigerant from the filter/dryer (see Figure 4).



Figure 4: Filter/dryer service valve

4) To gain access to the compressor discharge line, drain the toilet by opening the slide valve (see 1, Figure 5). Slacken the upper and lower hose clamps (2 and 3, Figures 5 and 6) and remove the hose connecting the toilet to the waste tank.

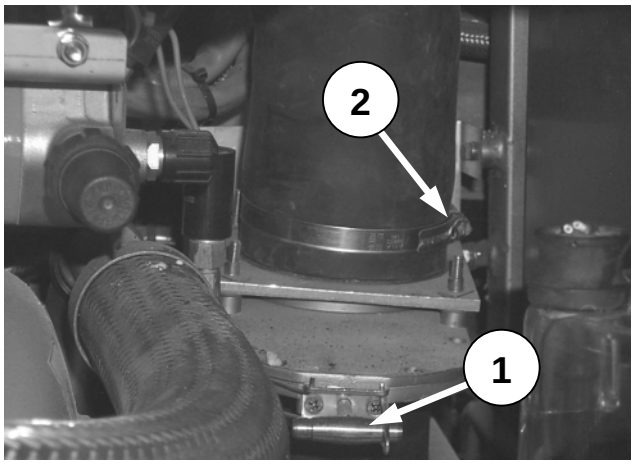


Figure 5: Waste tank slide valve (1) and lower hose clamp (2)

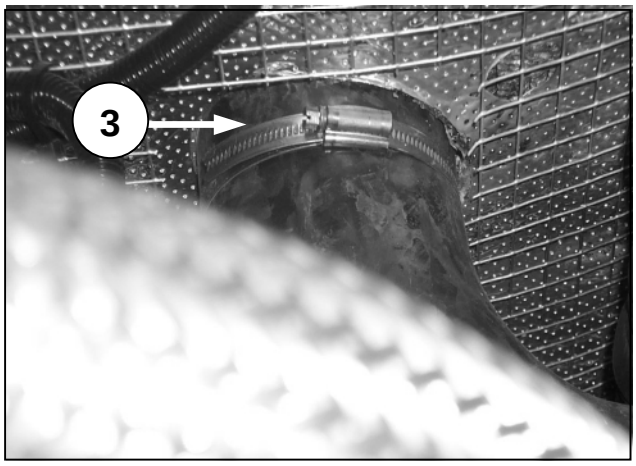


Figure 6: Waste tank upper hose clamp (3)

5. <u>To install repair kit VH 10909541</u>:

<u>NOTE</u>: Do not consider this part of the procedure if your coach has already been fitted with the copper discharge line means of support shown in Figures 7 or 8.
As a next step, proceed with the installation of the new rubber flex hose (steps 1 <u>and</u> 17 only).

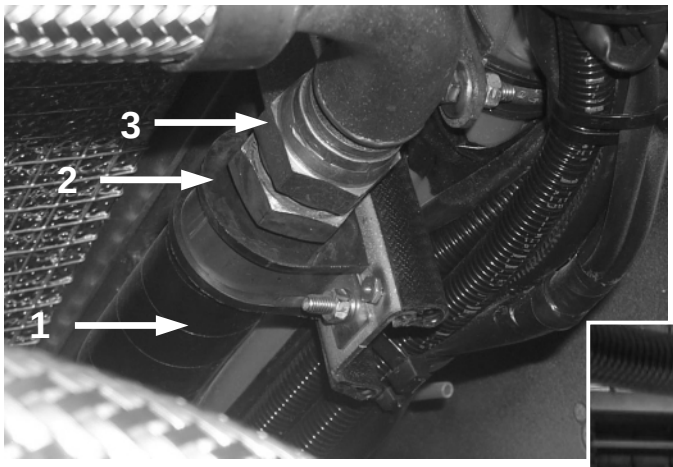


Figure 7: New factory installation

1. **Straight tubing**
2. **Rubber mounting**
3. **Extended (long body) fitting**

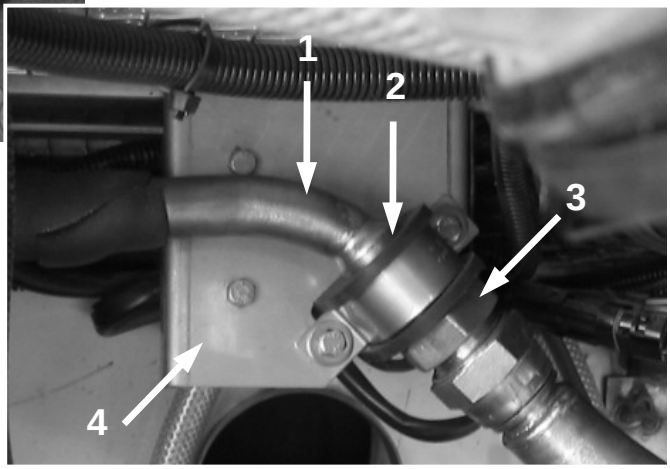


Figure 8: Field fix

1. **45° bent tubing**
2. **Rubber mounting**
3. **Extended (long body) fitting**
4. **Additional bracket**

Purpose of this part of the procedure (see Figures 9 and 11):

- To solder tube and fitting assembly VH 10910384 to the chassis mounted copper tubing (condenser side).
- To install additional mounting bracket VH 10901886 by bolting and welding it to the chassis mounted support bracket on the right-hand (compressor) side.
- To secure copper discharge line and fitting assembly VH 10910384 to bracket VH 10901866

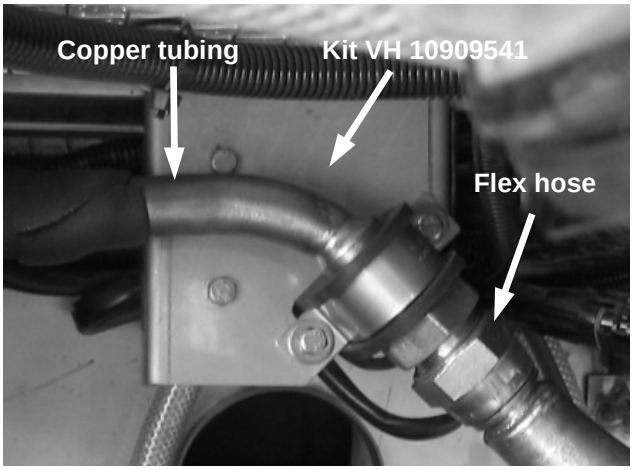


Figure 9: Discharge line repair kit VH 10909541 installed on C2045 chassis – RH (A/C compressor) side

1) At the RH discharge line support bracket, loosen the compressor flex hose nut. Remove the hose from the fitting. Repeat this at the service valve end. Remove and discard the hose.

2) Undo and remove the bolts, nuts, washers and hose clamp(s) securing the copper tubing to the RH support bracket. Discard the old clamp(s) and fasteners.

3) At the LH discharge line support bracket (see Figure 10), undo and remove the bolts, nuts, washers and hose clamp securing the tubing to the chassis.
Recover the clamp and fasteners.

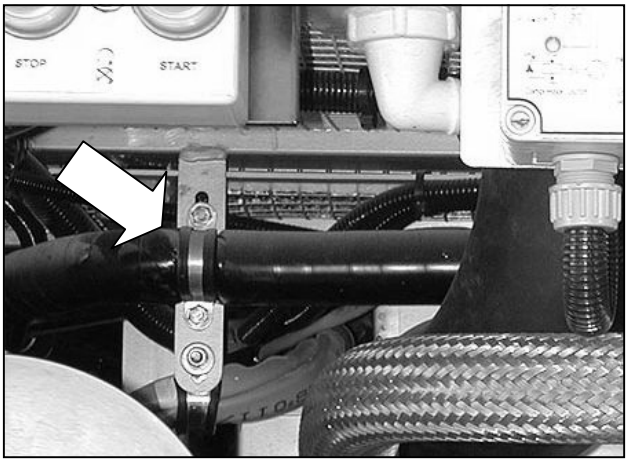


Figure 10: LH discharge line support bracket next to engine

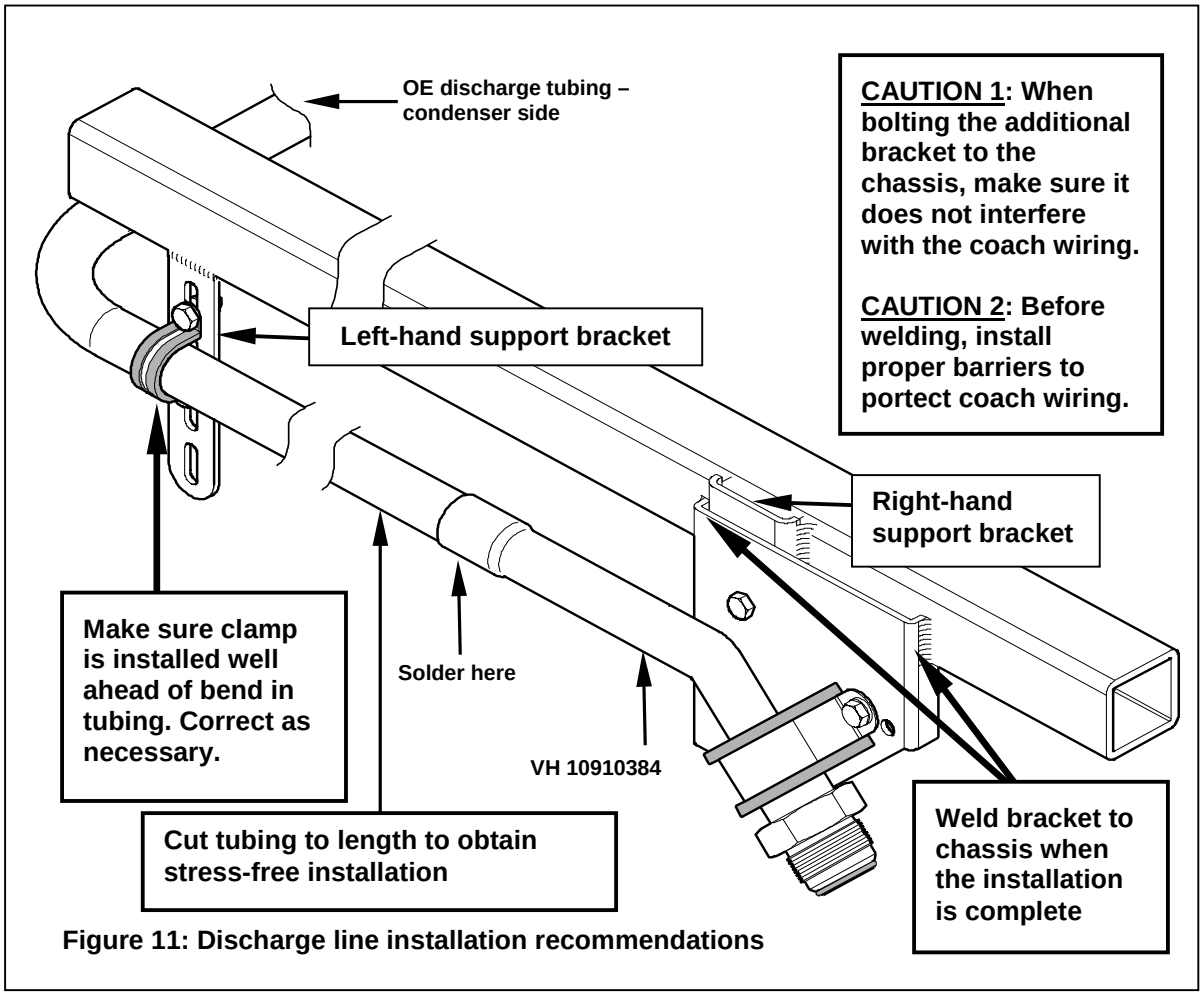


Figure 11: Discharge line installation recommendations

4) Starting at the fitting, remove about 1.5 ft of thermal insulation from the copper tubing.

5) Bolt bracket VH 10901886 and mounting hardware to the RH support bracket for a loose fit.

Before cutting the discharge line to accept tube and fitting assembly VH 10910384, take note of the following:

<u>NOTE</u>: When soldering has been completed it should be possible to clamp the fitting body and the rubber mounting stress-free to bracket VH 10901886 while at the same time there should be sufficient tube length to allow the tube to be clamped to the LH support bracket well ahead of the bend leading to the condenser.

6) Referring to the installation recommendations in Figure 11 and using tube and fitting assembly VH 10910384 as a template, mark and cut the discharge line tubing to suit.

7) Clean and prepare both the discharge line tubing and kit part VH 10910384 for soldering.

8) Install heat barriers to protect surrounding components and wiring from damage due to heat and weld spatter.

9) At the back of the condenser, disconnect the high pressure hose (see Figure 12). Connect the hose to a nitrogen cylinder equipped with a pressure regulator.

10) While flushing the discharge line with nitrogen, solder tube assembly VH 10910384 with silver rod to the tubing prepared in steps 4 through 7.
Have a fire extinguisher ready nearby.
Allow soldered joint to cool.

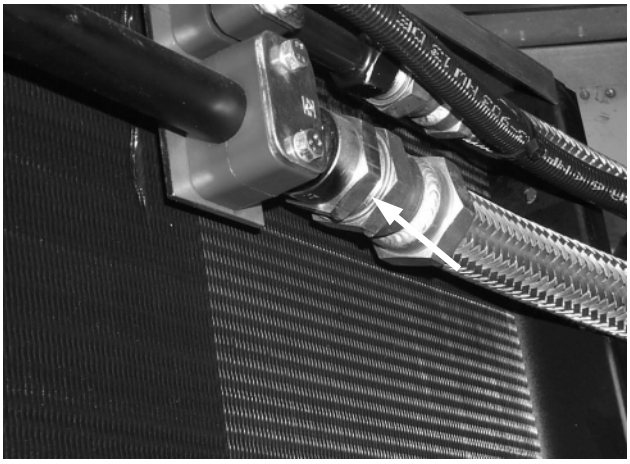


Figure 12: Condenser high pressure hose

11) Bolt additional bracket VH 10901886 to the RH support bracket.
Tightening torque of the fasteners: 15 ft.lbf (20 Nm).

12) Read the safety precautions and recommendations for welding and grinding in Attachment 1 to this Bulletin.

13) Weld bracket VH 10901886 to the chassis tubing in the places indicated in Figure 11. Allow welds to cool. Remove the heat barriers.

14) Assemble and install the copper discharge line, mounting rubber and hardware as shown in Figure 11. The discharge line is now supported by mounting rubber VH 10901210 and clamp VH 10901212 only.

15) Secure the discharge line to the LH support bracket using the recovered clamp and fasteners (see Figure 11).

16) At the condenser, disconnect the nitrogen cylinder, fit a new O-ring VH 10645815 and reconnect the condenser hose to the coach tubing.

17) Install a new O-ring VH 10645815 on the nose of both the service valve fitting (Figure 13a) and the copper discharge line fitting (Figure 13b). Connect the service valve tubing to the copper discharge line fitting with new rubber flex hose ABC-10220.
Run-up the hose nuts to finger tight, then tighten 1/2 to 3/4 turn.

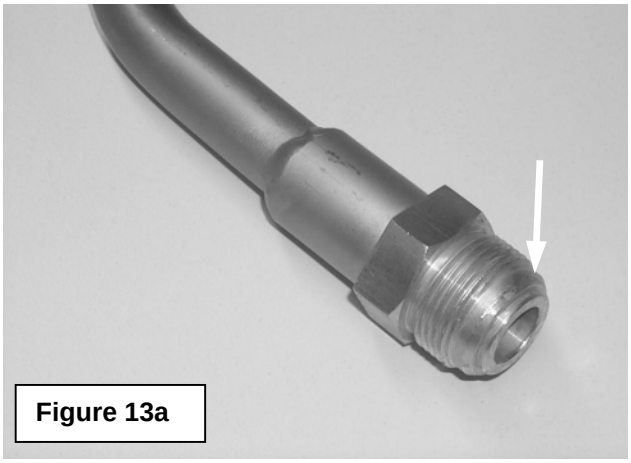


Figure 13a

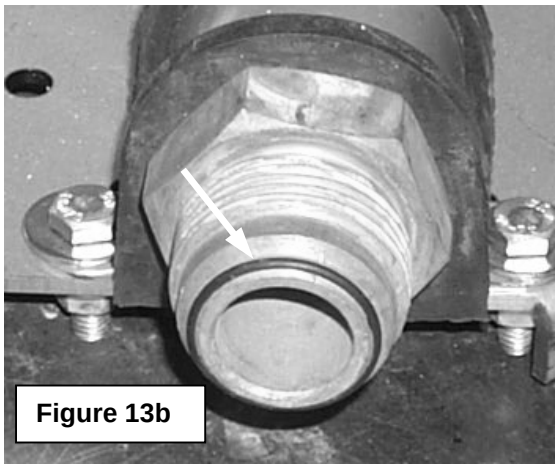


Figure 13b

6. To finalize repairs:

NOTE: Replace the filter dryer by a new one if there has been system damage.

1) Evacuate the refrigerant system.

2) Recharge the system to the required amount of refrigerant.
Check system contents at the receiver tank.

3) Return the service switch to the “Clima operation” position.

4) Run the system and check operation.

5) Check refrigerant lines for leaks. Correct as required.

6) Insulate and wrap the exposed copper tubing using insulation hose and duct tape.

7) Reinstall toilet to waste tank tubing.

Procedure complete.

SERVICE INFORMATION:

Service Bulletins are issued to supplement or supersede information in the Van Hool manuals. Note Service Bulletin number, date and subject on the register at the end of the relevant chapter(s). File Service Bulletin separately for future reference.

DISCLAIMER:

The procedures contained herein are not exclusive. Van Hool cannot possibly know, evaluate, or advise the transportation industry of all conceivable ways in which a procedure may be undertaken or of the possible consequences of each such procedure. Other procedures may be as good, or better, depending upon the particular circumstances involved.
Each carrier who uses the procedures herein must first satisfy itself thoroughly that neither the safety of its employees or agents, nor the safety or usefulness of any products, will be jeopardized by any procedure selected.

ATTACHMENT 1 TO VAN HOOL SERVICE BULLETIN SB1159

SAFETY PRECAUTIONS AND RECOMMENDATIONS FOR WELDING AND GRINDING:

1. Welding safety rules:

The following information pertaining to welding should be read before beginning any such procedure. The prohibitions and requirements contained herein must be followed during such procedure.

- Welding must be done only by a qualified and experienced person.
- It is the responsibility of the welder to make sure that his/her personal safety equipment and the welding equipment he/she is using are in a condition which will not endanger his/her health and safety or the health and safety of others.
- Adequate ground contact and barriers must be positioned as required to protect components (wiring, air-lines, hydraulic lines, fuel lines etc.) from damage due to heat, contact by weld spatter, arcing or other potentially damaging events associated with welding.
- Before welding the batteries should be disconnected to protect the vehicle's electronic equipment. Proceeds as follows (battery equalizer installed):

  1. Disconnect the battery equalizer ground cable. 2. Disconnect the battery ground cable. 3. Disconnect the battery positive cable. Reconnect for testing purposes as required.
  To reconnect the batteries, proceed in reverse order.

- Never look at the arc unless wearing a suitable helmet or face shield. Wear protective clothing and gloves.
- Do not permit bystanders, unless they are wearing protective gear.
- Never weld while standing in water or on damp ground.
- Have adequate ventilation.
- Do not adjust machine settings while the machine is under load.
- Keep cables tight in the sockets.
- Do not touch hot metal.
- Do not allow the welding rod/wire to touch anything but the work.
- Make sure there is nothing flammable near the working area.
- Always have a fire extinguisher of the correct type available.

2. Grinding safety rules:

Grinders can be dangerous. When improperly used, they are responsible for many serious and lasting injuries to the eyes, hands, face and body. Therefore you must always observe the following safety rules:

- Always wear eye protection (safety goggles, face shield). Wear leather gloves.
- Adequate barriers must be positioned as required to protect components (wiring, air-lines, hydraulic lines, fuel lines, drive shaft etc.) from damage by grinding sparks.
- Before doing any grinding on the coach, thoroughly clean the affected area.
- Keep abrasive discs tight, clean and true.
- Allow grinder to reach full rpm before using.
- Do not put aside the grinder until the while has completely stopped revolving.
- Never strike a grinding wheel while revolving. It may shatter and explode.
- Do not grind in the presence of explosive vapors (gasoline, paint thinner, batteries…)
- Before installing a new grinding disc, disconnect the electric mains or air supply line.

- When installing a new disc make certain:

  → It is designed for the rpm of the grinder.
  → It has the correct size.
  → It is properly fixed.

- Never remove the grinding disc guard.

Safety precautions and recommendations for welding and grinding complete.

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